

Geode™ CS5530 I/O Companion Multi-Function South Bridge

General Description

The CS5530 I/O Companion is designed to work in conjunction with the GXLV processor series and GXm processor; all members of the National Semiconductor® Geode™ family of products. Together the Geode processor and CS5530 provide a system-level solution well suited for the high performance needs of battery powered devices such as the WebPAD™ system, a GXLV processor/CS5530 based design. They also satisfy the high performance needs of a host of other devices such as digital set-top boxes and thin client devices. Due to the low power consumption of a GXLV processor, thermal design is eased, allowing for fanless system design.

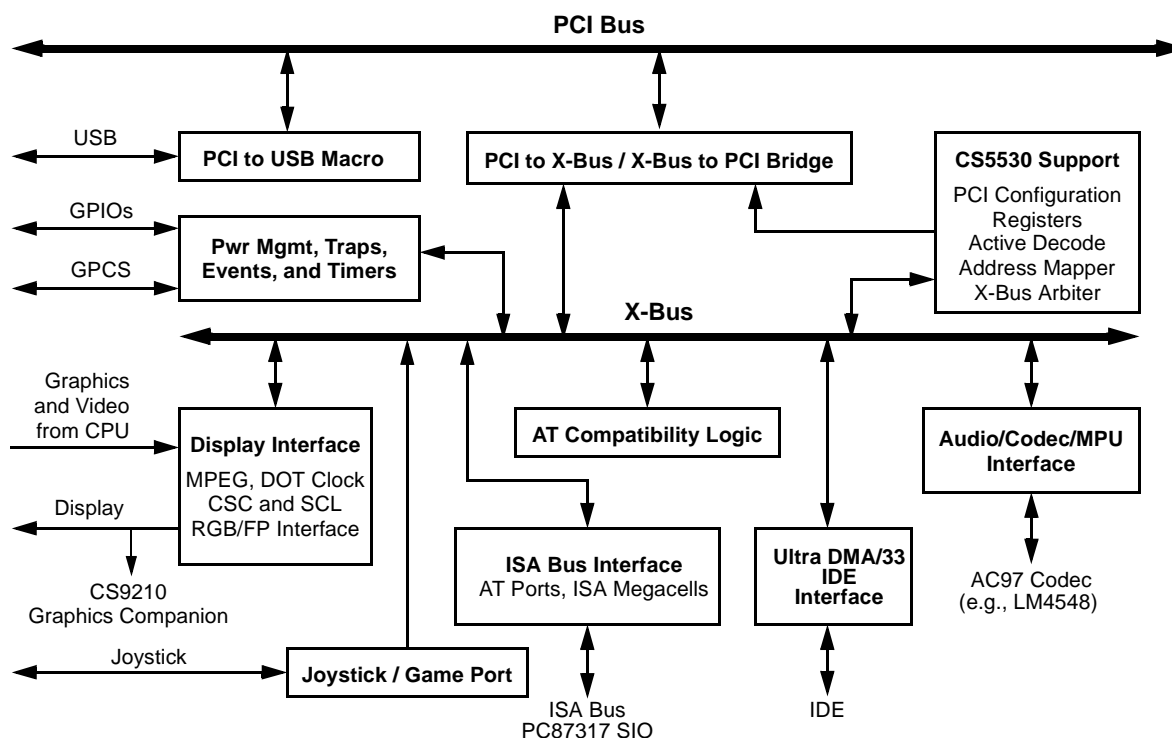
The CS5530 I/O Companion is a PCI-to-ISA bridge (South Bridge), ACPI-compliant chipset that provides AT/ISA style functionality. To those familiar with PC architecture this enables a quicker understanding of the CS5530's architecture. The device contains state-of-the-art power management that enables systems, especially

battery powered systems, to significantly reduce power consumption.

Audio is supported through PCI bus master engines which connect to an AC97 compatible codec such as the National Semiconductor LM4548. If industry standard audio is required, a combination of hardware and software called Virtual System Architecture™ (VSA™) technology is provided.

The Geode GXLV processor's graphics/video output is connected to the CS5530. The CS5530 graphics/video support includes a PLL that generates the DOT clock for the GXLV processor (where the graphics controller is located), video acceleration hardware, palette RAM plus three DACs for RGB output to CRT, and digital RGB that can be directly connected to TFT panels or NTSC/PAL encoders. The digital RGB output can also be connected to the National Semiconductor CS9210 Graphics Companion (a DSTN Controller) for DSTN panel support.

Geode™ CS5530 Internal Block Diagram



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Two bus mastering IDE controllers are included for support of up to four ATA-compliant devices. A two-port Universal Serial Bus (USB) provides high speed, Plug & Play expansion for a variety of consumer peripheral devices such as a keyboard, mouse, printer, and digital cameras. If additional functions are required, such as real time clock, floppy disk, PS2 keyboard, and PS2 mouse, a SuperI/O such as the PC87317 can be easily connected to the CS5530.

Features

General Features

- Designed for use with the GXLV and GXm Geode processors
- 352-Terminal Tape Ball Grid Array (TBGA) package
- 3.3V or 5.0V PCI bus compatible
- 5.0V tolerant I/O interfaces
- 3.3V core

PCI-to-ISA Bridge

- PCI 2.1 compliant
- Supports PCI initiator-to-ISA and ISA master-to-PCI cycle translations
- PCI master for audio I/O and IDE controllers
- Subtractive agent for unclaimed transactions
- PCI-to-ISA interrupt mapper/translator

AT Compatibility

- Two 8259A-equivalent interrupt controllers
- 8254-equivalent timer
- Two 8237-equivalent DMA controllers
- Boot ROM and keyboard chip select
- Extended ROM to 16 MB

Bus Mastering IDE Controllers

- Two controllers with support for up to four IDE devices
- Independent timing for master and slave devices for both channels
- PCI bus master burst reads and writes
- Ultra DMA/33 (ATA-4) support
- Multiword DMA support
- Programmed I/O (PIO) Modes 0-4 support

Power Management

- Intelligent system controller supports multiple power management standards:
 - Full ACPI and Legacy (APM) support
 - Directly manages all GXLV and GXm processor power states (including automatic Suspend modulation for optimal performance/thermal balancing)
- I/O traps and idle timers for peripheral power management
- Up to eight GPIOs for system control:
 - All eight are configurable as external wakeup events
- Dedicated inputs for keyboard and mouse wakeup events

XpressAUDIO™ Subsystem

- Provides "back-end" hardware support via six buffered PCI bus masters
- AC97 codec interface:
 - Specification Revision 1.3, 2.0, and 2.1 compliant interface. Note that the codec (e.g., LM4548) must have SRC (sample rate conversion) support

Display Subsystem Extensions

- Complements the GXLV and GXm processor's graphics and video capabilities:
 - Three independent line buffers for accelerating video data streams
 - Handles asynchronous video and graphics data streams concurrently from the processor
 - YUV to RGB conversion hardware
 - Arbitrary X & Y interpolative scaling
 - Color keying for graphics/video overlay
- VDACS / Display interface:
 - Three integrated DACs
 - Palette RAM:
 - Provides gamma correction for graphics data streams
 - Provides brightness/contrast correction for video data streams
 - Integrated DOT clock generator
 - Digital RGB interface drives TFT panels or standard NTSC/PAL encoders

Universal Serial Bus

- Two independent USB interfaces:
 - Open Host Controller Interface (OpenHCI) specification compliant
 - Second generation proven core design

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